

Microsoft DevOps Solutions: Designing a Failure Prediction Strategy

LEVERAGING AZURE CAPABILITIES FOR FAILURE PREDICTION



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Learning Objectives



Analyze behavior of system with regards to load and failure conditions

Calculate when a system will fail under various conditions

Measure baseline metrics for system

Recommend the appropriate tools for a failure prediction strategy



Module Overview



Understanding application components and points of failure

Establishing baselines

Identifying usage patterns

Using AI for failure prediction

How Azure uses predictive maintenance



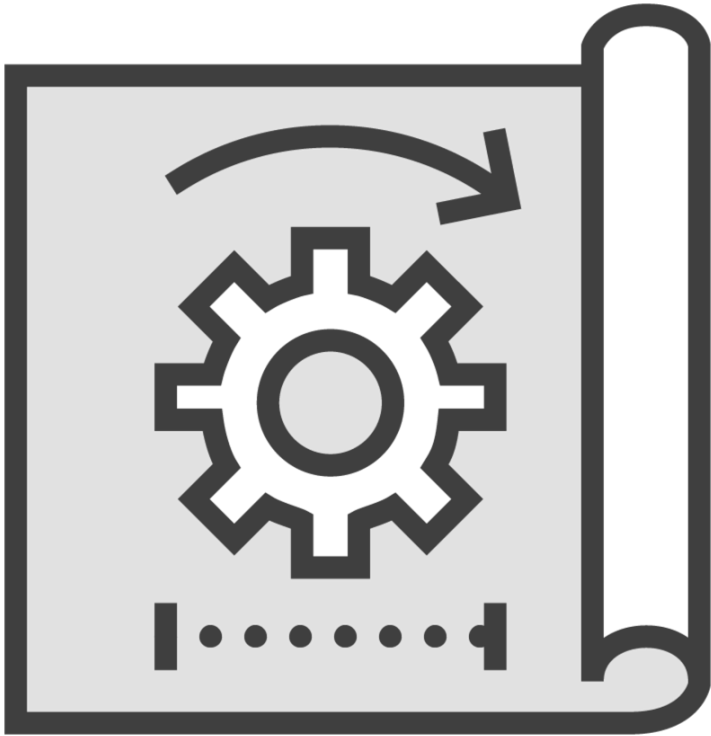


Failures can happen in
hardware and software.



The key is to predict where failures can and will occur to mitigate ahead of user “notification”.

Know Your Application



A thorough understanding of the application is critical to predict failures

- Components used
 - What are their SLA's?
 - Are there resource/subscription limits?
- Dependencies
- Client application
- Usage and code flows
- End-user access
- Authentication
- Vulnerabilities

“Best block, no be there!”
Mr. Miyagi



What Happens in the Event of a Component Failure?

Most components will self-heal with time varying

Always important to know where the state is as this is most critical to protect

Utilize features like fault domains, availability zones and regions with multiple instances to protect against different levels of infrastructure failure

Understand the SLA of the service and understand the time taken to repair

Refactoring to cloud native capabilities helps shift responsibility



Baselining the Workload



A key to predicting failure is to understand normal conditions

Once a baseline is established the deviations can be detected and alerted upon

Azure Monitor and Application Insights are key tools to capture baseline information

Azure Monitor insights provides curated views of the key information per service

Metric-based alerts can use dynamic thresholds

Application Insights



Application services have different levels of native metrics and logging

Integrates with Log Analytics workspace

Codeless attach available

Has full insight into application but will focus on failure detection

Can help understand the patterns of use

Client Applications



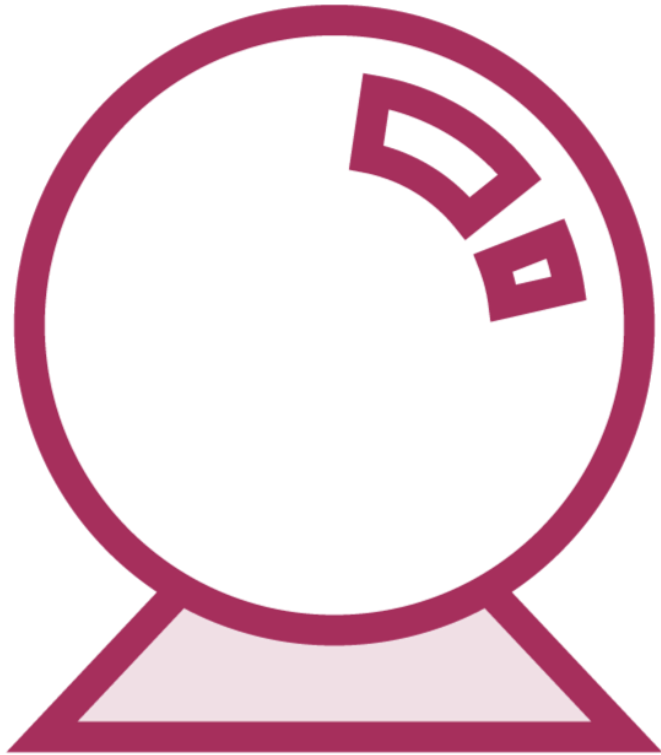
Microsoft App Center can be used to capture information about usage and crashes

Minimal code changes required to send crash information

This will help see common use patterns and crashes being seen to aid in effort focus



Predicting Failure



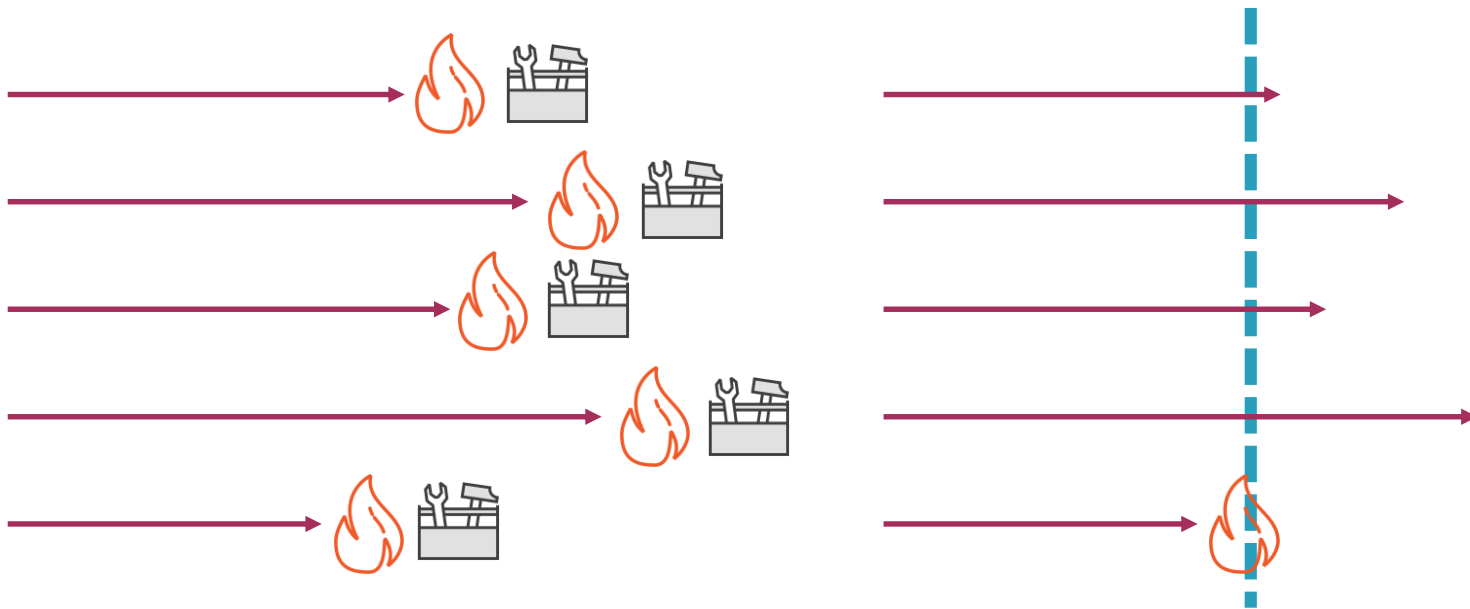
Many of the solutions covered use machine learning to alert based on trends and deviations from learnt patterns

The Azure machine learning is available to aid in predictive maintenance

This enables maintenance to be performed ahead of an outage in a planned maintenance window

Data is ingested to Azure using numerous options then machine learning model is trained and used

Predictive Maintenance

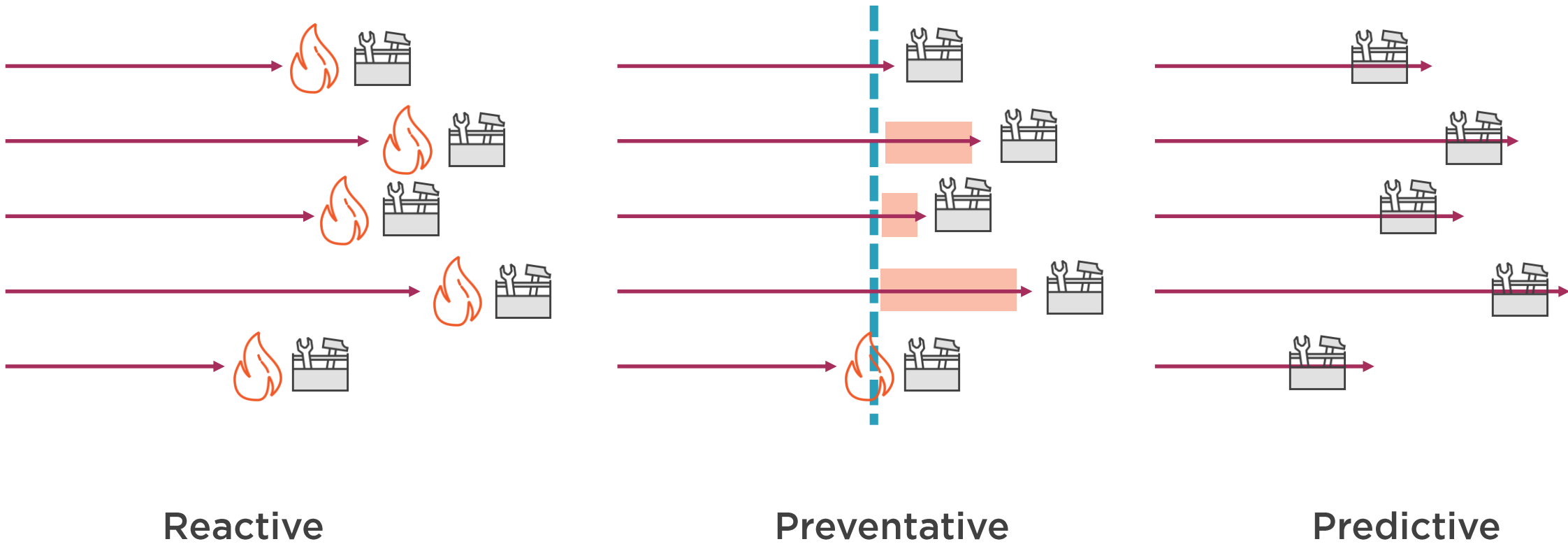


Reactive

Preventative



Predictive Maintenance



How Azure Uses Predictive Maintenance



Azure is primarily built on resiliency through software

Project Tardigrade focuses on improving the Azure platform resilience

Multiple technologies leveraged including in-place healing and live migration based on software and hardware failure prediction



Summary



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Thank you
and
good luck!

